iMcV-Modules

Operation Manual

Above illustrations are representative; some minor differences may be present in actual product

FCC Radio Frequency Interference Statement

iMcV-S2MM/1250 and iMcV-S2SM/1250

This equipment has been tested and found to comply with the limits for a Class A computing device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which the user will be required to correct the interference at his own expense.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

The use of non-shielded I/O cables may not guarantee compliance with FCC RFI limits. This digital apparatus does not exceed the Class Alimits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par le ministère des Communications du Canada.

iMcV-LIM, iMcV-PIM, iMcV-S2MM/155, iMcV-M2MM/155 and iMcV-S2SM/155

This equipment has been tested and found to comply with the limits for a Class B computing device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which the user will be required to correct the interference at his own expense.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

The use of non-shielded I/O cables may not guarantee compliance with FCC RFI limits. This digital apparatus does not exceed the Class B limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de classe B prescrites dans le Règlement sur le brouillage radioélectrique publié par le ministère des Communications du Canada.

Warranty

IMC Networks warrants to the original end-user purchaser that this product, EXCLUSIVE OF SOFTWARE, shall be free from defects in materials and workmanship under normal and proper use in accordance with IMC Networks' instructions and directions for a period of six (6) years after the original date of purchase. This warranty is subject to the limitations set forth below.

At its option, IMC Networks will repair or replace at no charge the product which proves to be defective within such warranty period. This limited warranty shall not apply if the IMC Networks product has been damaged by unreasonable use, accident, negligence, service or modification by anyone other than an authorized IMC Networks Service Technician or by any other causes unrelated to defective materials or workmanship. Any replaced or repaired products or parts carry a ninety (90) day warranty or the remainder of the initial warranty period, whichever is longer.

To receive in-warranty service, the defective product must be received at IMC Networks no later than the end of the warranty period. The product must be accompanied by proof of purchase, satisfactory to IMC Networks, denoting product serial number and purchase date, a written description of the defect and a Return Merchandise Authorization (RMA) number issued by IMC Networks. No products will be accepted by IMC Networks which do not have an RMA number. For an RMA number, contact IMC Networks at PHONE: (800) 624-1070 (in the U.S and Canada) or (949) 465-3000 or FAX: (949) 465-3020. The end-user shall return the defective product to IMC Networks, freight, customs and handling charges prepaid. End-user agrees to accept all liability for loss of or damages to the returned product during shipment. IMC Networks shall repair or replace the returned product, at its option, and return the repaired or new product to the end-user, freight prepaid, via method to be determined by IMC Networks. IMC Networks shall not be liable for any costs of procurement of substitute goods, loss of profits, or any incidental, consequential, and/or special damages of any kind resulting from a breach of any applicable express or implied warranty, breach of any obligation arising from breach of warranty, or otherwise with respect to the manufacture and sale of any IMC Networks product, whether or not IMC Networks has been advised of the possibility of such loss or damage.

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About the iMcV-Modules

iMcV-Modules are SNMP-manageable and install in the modular, SNMP-manageable iMediaChassis series in the unmanaged MediaChassis series. The following media conversion and fiber mode conversion iMcV Modules are described in this manual:

iMcV-PIM

Ethernet module providing a single conversion between 10Base-T twisted pair and 10Base-FL single-mode or multi-mode fiber. Each iMcV-PIM includes one RJ-45 connector and one pair of ST or SC fiber optic connectors. **When connecting 10 Mbps iMcV-PIM Media Converters, the end devices must be set to Force mode.**

TP LinkLoss and FO LinkLoss are always enabled—please see the table later in this manual.

iMcV-LIM

Fast Ethernet module provides a single conversion between 100Base-TX twisted pair and 100Base-FX/SX single-mode or multi-mode fiber. Each iMcV-LIM includes one RJ-45 connector and one pair of ST or SC fiber optic connectors.

Also available in a single-strand fiber version, iMcV-LIM TX/SSFX allows two wavelengths to share one fiber strand – Full-Duplex data travels on different wavelengths (1310 nm and 1550 nm) – doubling the capacity of fiber. Includes one RJ-45 connector and one SC fiber connector.

iMcV-S2MM/ M2MM/S2SM

Protocol-independent modules provide a single conversion between single-mode and multi-mode (S2MM*) fiber, 1310 nm to 1550 nm single-mode (S2SM), or 850 nm to 1300 nm multi-mode (M2MM). Supported transmission speeds are: 10-155 Mbps and 622-1250Mbps. Each module includes two pairs of ST or SC fiber optic connectors (or small form factor connector). Single-strand fiber versions also available.

For information about other iMcV-Modules, refer to their respective manuals and datasheets on the IMC Networks web site at:
http://www.imcnetworks.com/tech/techsup.asp

Installation

iMcV-Modules install in any IMC Networks SNMP-manageable iMediaChassis series or in any MediaChassis. To install an iMcV-Module, remove the blank bracket covering the slot where the module is to be installed by removing the screw on the outside edge of the bracket. Slide the iMcV Module into the chassis, via the card guides, until the module is seated securely in the connector. Secure the module to the chassis by tightening the captive screw. Save any blanks removed during installation for future use should configuration requirements change.

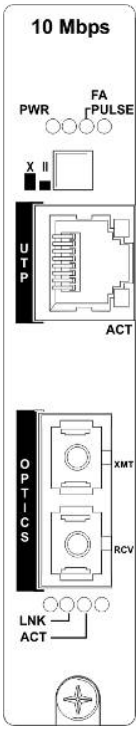
LED Operation

Each iMcV-Module features diagnostic LEDs that provide information on features and ports.

LEDs on iMcV-PIM (-10)

The LED functions are as follows:

PWR	Glows green when unit has power.
LNK (RJ-45)	Glows green if link is established on the twisted pair port (located on RJ-45).
ACT (RJ-45)	Glows amber when data is being passed on the twisted pair (located on RJ-45).
LNK	Glows green when link is established on the fiber port.
ACT	Glows green if data is being passed on the fiber port.
FA Pulse	Glows green when Pulsing FiberAlert is enabled

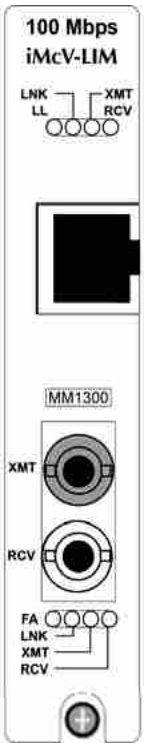


LEDs on iMcV-LIM

The LED functions are as follows:

LL	Glows green when FX LinkLoss is enabled.
LNK	Glows green when a link is established on the port.
XMT	Blinks green when port is transmitting data.
RCV	Blinks yellow when port is receiving data.
FA*	Glows green when FiberAlert is enabled.

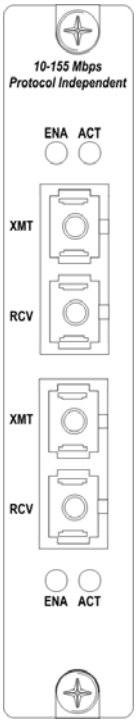
*FiberAlert is not available/applicable on single-strand versions of iMcV-LIM.



LEDs on iMcV-S2MM/S2SM/M2MM

The LED functions on iMcV-S2MM/S2SM/M2MM are as follows:

ENA	Glows green when port is enabled.
ACT	Glows yellow in normal operation, indicating that fiber is connected and the receiver is seeing light pulses. (As these are protocol-independent modules, there is no true link signal available.)



Configuration Instructions

Many iMcV-Modules have user-configurable features (e.g., FiberAlert, LinkLoss, Auto Negotiation, etc.). Refer to the chart for information on available features on each module. Instructions for configuring both managed (via an SNMP-compatible management application such as iView²) and unmanaged modules follow.

Managed Modules

To manage one or more iMcV-Modules, an SNMP agent must be present in the chassis. The iMediaChassis series, available in 3, 6 or 20 slots in both AC and DC, requires a separate SNMP Management Module. To configure managed modules, install the module first, then configure it by using the management software.

NOTE
Management software overrides any hardware settings (e.g., jumper, switch, etc.), so make sure the module is configured through the software before beginning normal operation. Until a module installed in a managed chassis is configured via the software, it will operate using the hardware configuration.

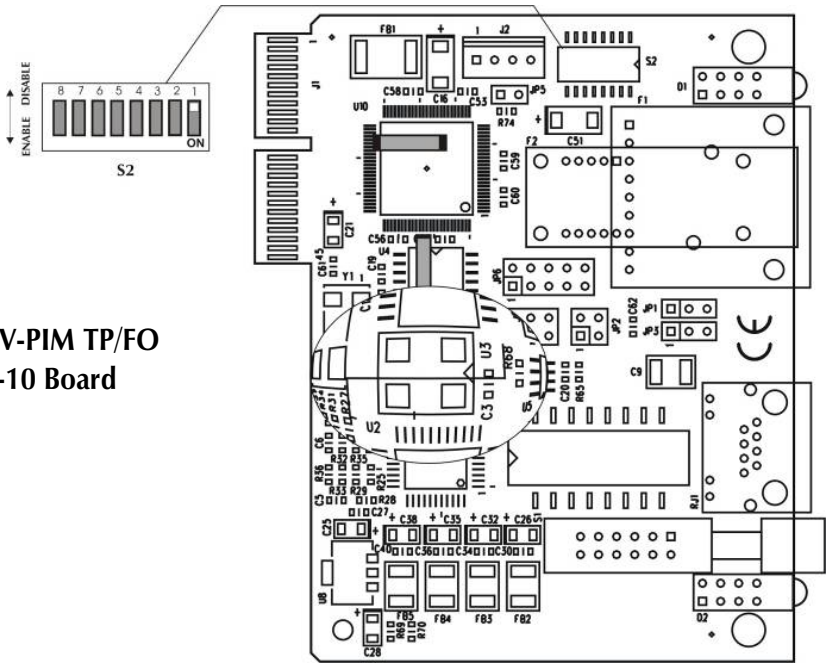
Unmanaged Modules

Before beginning installation of the iMcV-Modules, configure them for the desired features. The chart below states the available features and settings for the iMcV-PIM and iMcV-LIM modules. The board diagrams later in this manual show the jumper/switch locations on the modules. **Since there are no user-configurable features on the iMcV-S2MM/S2SM/M2MM modules, they can be installed straight from the box.**

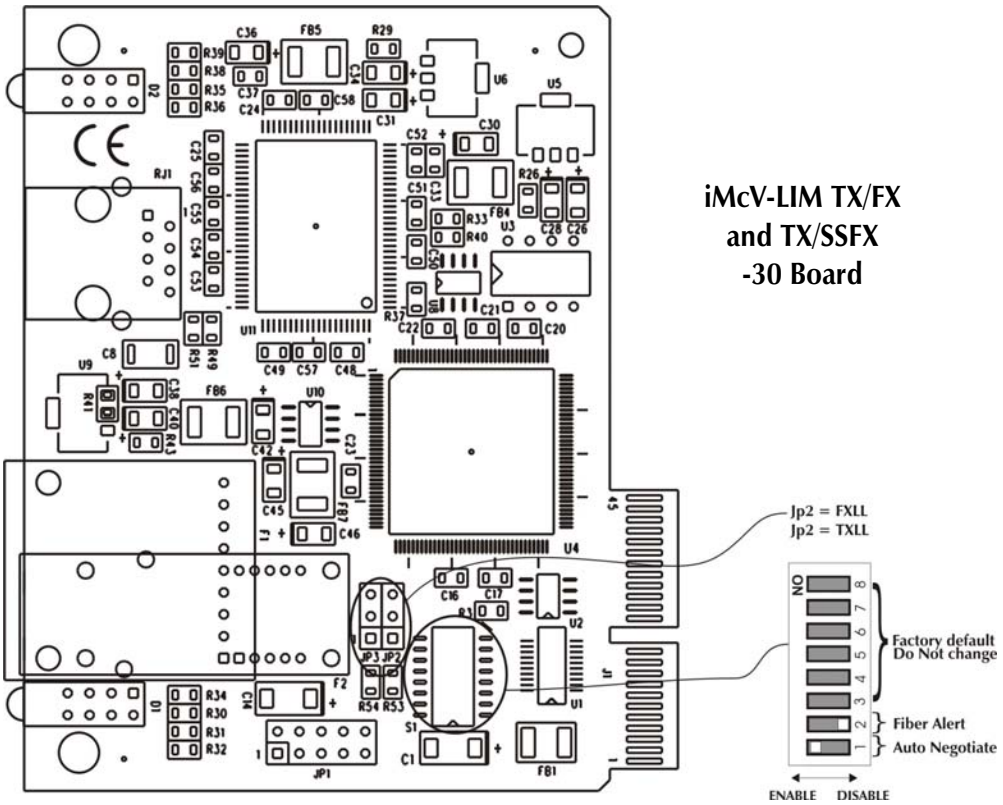
After configuring the jumpers/switches for the desired settings, install the module and connect the appropriate cables (refer to the *Installation* section for more information).

iMcV-Module Jumper/Switch Configuration Chart

Module	*Feature*	*Jumper /Switch*	*ON*	*OFF*	*Default*
IMcV-PIM TP/FO -10 Board	Pulsing FiberAlert	DIP Switch 1	1-2	2-3	OFF
iMcV-LIM TX/FX and TX/SSFX -30 Board	FX LinkLoss	JP2	1-2	2-3	OFF
	TX LinkLoss	JP3	1-2	2-3	OFF
	Auto Negotiation	DIP Switch 1 on S1	see board	see board	ON
	FiberAlert*	DIP Switch 2 on S1	see board	see board	OFF



iMcV-PIM TP/FO -10 Board



iMcV-LIM TX/FX and TX/SSFX -30 Board

About LinkLoss, FiberAlert, and Pulsing FiberAlert

Some iMcV-Modules include advanced troubleshooting features that help locate silent failures on the network. Troubleshooting features include:

- FO/FX LinkLoss (a.k.a. Fiber LinkLoss or LinkLoss)
- TP/TX LinkLoss (a.k.a. Twisted Pair LinkLoss or Reverse LinkLoss)
- FiberAlert
- Pulsing FiberAlert

It is important to understand how FiberAlert and LinkLoss work, and how they will react in a specific network configuration, before attempting to install the enclosed module(s).

**** WARNING ****

Installing modules without understanding the effects of FiberAlert and LinkLoss can cause perfectly functioning units to appear flawed or even nonfunctional.

About Link Integrity

During normal operation, link integrity pulses are transmitted by all point-to-point Ethernet devices. When an IMC Networks media converter receives valid link pulses, it knows that the device to which it is connected is up and sending pulses, and that the copper or fiber cable coming from that device is intact. The appropriate LNK (link) LED is lit to indicate this.

The IMC Networks media converter also sends out link pulses from its copper and fiber transmitters, but normally has no way of knowing whether the cable to the other device is intact and the link pulses are reaching the other end. The combination of FiberAlert and LinkLoss allows this information to be obtained, even when physical access to a remote device (and its link integrity LED) is not available.

FO/FX LinkLoss

FO/FX LinkLoss is a troubleshooting feature. When a fault occurs on the fiber segment of a conversion, FO/FX LinkLoss detects the fault and passes this information to the twisted pair segment. If a media converter is not receiving a fiber link, FO/FX LinkLoss disables the transmitter on the media converter's twisted pair port. This results in a loss of link on the device connected to the twisted pair port.

TP/TX LinkLoss

TP/TX LinkLoss is another troubleshooting feature. When a fault occurs on the twisted pair segment of a conversion, TP/TX LinkLoss detects the fault and passes this information to the fiber segment. If a media converter is not receiving a twisted pair link, TP/TX LinkLoss disables the transmitter on the media converter's fiber port. This results in a loss of link on the device connected to the fiber port.

FiberAlert

FiberAlert minimizes the problems associated with the loss of one strand of fiber. If a strand is unavailable, the IMC Networks device at the receiver end notes the loss of link. The device will then stop transmitting data and the link signal until a signal or link pulse is received. The result is that the link LED on BOTH sides of the fiber connection will go out indicating a fault somewhere in the fiber loop. Using FiberAlert, a local site administrator is notified of a fault and can quickly determine where a cable fault is located.

NOTE
Enable FiberAlert only on one side of the media conversion; enabling it on both sides will keep both transmitters off indefinitely.

Pulsing FiberAlert

Available on products 850-14940 through 850-14949 (board revision -10), Pulsing FiberAlert minimizes the problems associated with the loss of one strand of fiber. If a strand is unavailable, the IMC Networks device at the receiver end notes the loss of link. The device will then stop transmitting data and start sending link pulses. Until a valid link is received, the fiber link LED will be OFF on the device on the receiver side of the fiber strand with the fault while the fiber link LED on the other unit will blink. Pulsing FiberAlert notifies a local site administrator of a fault, allowing quick determination of where a cable fault resides.

NOTE
Pulsing FiberAlert can be enabled on both sides of a conversion.

Using FiberAlert and LinkLoss

The following chart provides an overview of the troubleshooting features, their functionality and the recommended settings for a pair of media converters in a typical central/main site to remote site application:

FiberAlert and LinkLoss			
Feature	**Enabled**	**Fault Location**	**Disabled LEDs**
FiberAlert	Remote Site Only	Fiber	Fiber
TX LinkLoss	Remote Site Only	Twisted Pair	Fiber
FX LinkLoss	Home Site (or both)	Fiber	Twisted Pair

If unsure of how best to implement these features in a specific configuration, please contact IMC Networks technical support at (800) 624-1070 (U.S./Canada), +32-16-550880 (Europe) or via e-mail at: techsupport@imcnetworks.com

Twisted Pair Crossover/Straight-Through Connections

iMcV-Modules support both crossover and straight-through CAT5 twisted pair cabling types of connections by one of the following two methods:

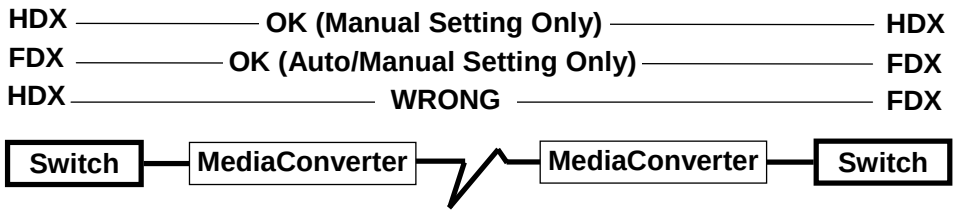
AutoCross — iMcV-LIM Modules include AutoCross, a feature which automatically selects between a crossover workstation or straight-through/repeater hub connection depending on the connected device.

MDI/MDI-X Switch — iMcV-PIMs feature a push button switch, located next to the RJ-45 connector, for selecting the type of connection. Select a straight-through connection by pressing the push-button IN. The button should be in the OUT position for a crossover connection. If unsure of the type of connection, set the push button to a position that makes the twisted pair LNK (link) LED glow.

Auto Negotiation on iMcV-LIM

iMcV-LIM Modules include the feature Auto Negotiation. When Auto Negotiation is enabled, the module negotiates as a 100 Mbps Full-Duplex device; if the device the iMcV-LIM is connected to can operate at 100 Mbps Full-Duplex, a link will be established.

If the twisted pair port on the other device does not have the ability to Auto Negotiate, or if a 100 Mbps Half-Duplex connection is desired, Auto negotiation on iMcV-LIM must be disabled. Half- and Full-Duplex settings must be manually set, and match, on both devices connected to the iMcV-LIM. The following diagram shows a typical application, followed by a table with three possible configurations.



End to End Connection	Switch	McPC TX/FX
Half-Duplex	Manually Configure HDX	Auto Negotiation OFF
Full-Duplex	Manually Configure FDX	Auto Negotiation OFF
Full-Duplex	Auto negotiation ON	Auto Negotiation ON

Configure Auto Negotiation on an iMcV-LIM by adjusting the DIP Switch setting (for unmanaged modules) or via the management software. Refer to the diagrams in this manual for switch location and settings.

Installation Troubleshooting

During installation, first test the fiber and twisted pair connections with all troubleshooting features disabled, then enable these features, if desired, just before final installation. This will reduce the features' interference with testing.

When working with units where the features cannot be disabled, it is necessary to establish BOTH the twisted pair and fiber connections before the link LEDs will light.

To test a media converter by itself, first make sure to have an appropriate fiber patch cable, then follow these steps to test:

1. Connect the media converter to the twisted pair device with a twisted pair cable.
2. Loop a single strand of fiber from the transmit port to the receive port of the media converter.
3. Verify that there are both twisted pair and fiber link (see LEDs, below) on the media converter.

Make sure to use the appropriate twisted pair cable, and have the crossover/pass-through switch set correctly.

When connecting 10 Mbps iMcV-PIM Media Converters, the end devices must be set to Force mode.

Specifications

Power Consumption (Typical @ 5V):

iMcV-PIM (-10): 600 mA
lMcV-LIM: 800 mA
iMcV-S2MM/M2MM/S2SM: 620 mA

Operating Temperature

32° to 122° F (0° to 50° C)

Storage Temperature

0° to 160° F (-20° to +70° C)

Humidity

5 to 95% (non-condensing); 0 to 10,000 ft. altitude

Dimensions

Single Slot iMcV-Module

IMC Networks Technical Support

Tel: (949) 465-3000 or (800) 624-1070 (in the U.S. and Canada);

+32-16-550880 (Europe)

Fax: (949) 465-3020

E-Mail: techsupport@imcnetworks.com

Web: www.imcnetworks.com

Fiber Optic Cleaning Guidelines

Fiber Optic transmitters and receivers are extremely susceptible to contamination by particles of dirt or dust, which can obstruct the optic path and cause performance degradation. Good system performance requires clean optics and connector ferrules.

1. Use fiber patch cords (or connectors, if you terminate your own fiber) only from a reputable supplier; low-quality components can cause many hard-to-diagnose problems in an installation.
2. Dust caps are installed at IMC Networks to ensure factory-clean optical devices. These protective caps should not be removed until the moment of connecting the fiber cable to the device. Should it be necessary to disconnect the fiber device, reinstall the protective dust caps.
3. Store spare caps in a dust-free environment such as a sealed plastic bag or box so that when reinstalled they do not introduce any contamination to the optics.
4. If it is suspected that the optics have been contaminated, alternate between blasting with clean, dry, compressed air and flushing with methanol to remove particles of dirt.

Electrostatic Discharge Precautions

Electrostatic discharge (ESD) can cause damage to any product, add-in modules or stand alone units, containing electronic components. Always observe the following precautions when installing or handling these kinds of products

1. Do not remove unit from its protective packaging until ready to install.
2. Wear an ESD wrist grounding strap before handling any module or component. If the wrist strap is not available, maintain grounded contact with the system unit throughout any procedure requiring ESD protection.
3. Hold the units by the edges; do not touch the electronic components or gold connectors.
4. After removal, always place the boards on a grounded, static-free surface, ESD pad or in a proper ESD bag. Do not slide the modules or stand alone units over any surface.

WARNING! Integrated circuits and fiber optic components are extremely susceptible to electrostatic discharge damage. Do not handle these components directly unless you are a qualified service technician and use tools and techniques that conform to accepted industry practices.

CE: The products described herein comply with the Council Directive on Electromagnetic Compatibility (2004/108/EC) For further details, contact IMC Networks.

CE

Class 1 Laser product, Luokan 1 Laserlaite,
Laser Klasse 1, Appareil A'Laser de Classe 1

European Directive 2002/96/EC (WEEE) requires that any equipment that bears this symbol on product or packaging must not be disposed of with unsorted municipal waste. This symbol indicates that the equipment should be disposed of separately from regular household waste. It is the consumer's responsibility to dispose of this and all equipment so marked through designated collection facilities appointed by government or local authorities. Following these steps through proper disposal and recycling will help prevent potential negative consequences to the environment and human health. For more detailed information about proper disposal, please contact local authorities, waste disposal services, or the point of purchase for this equipment.

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